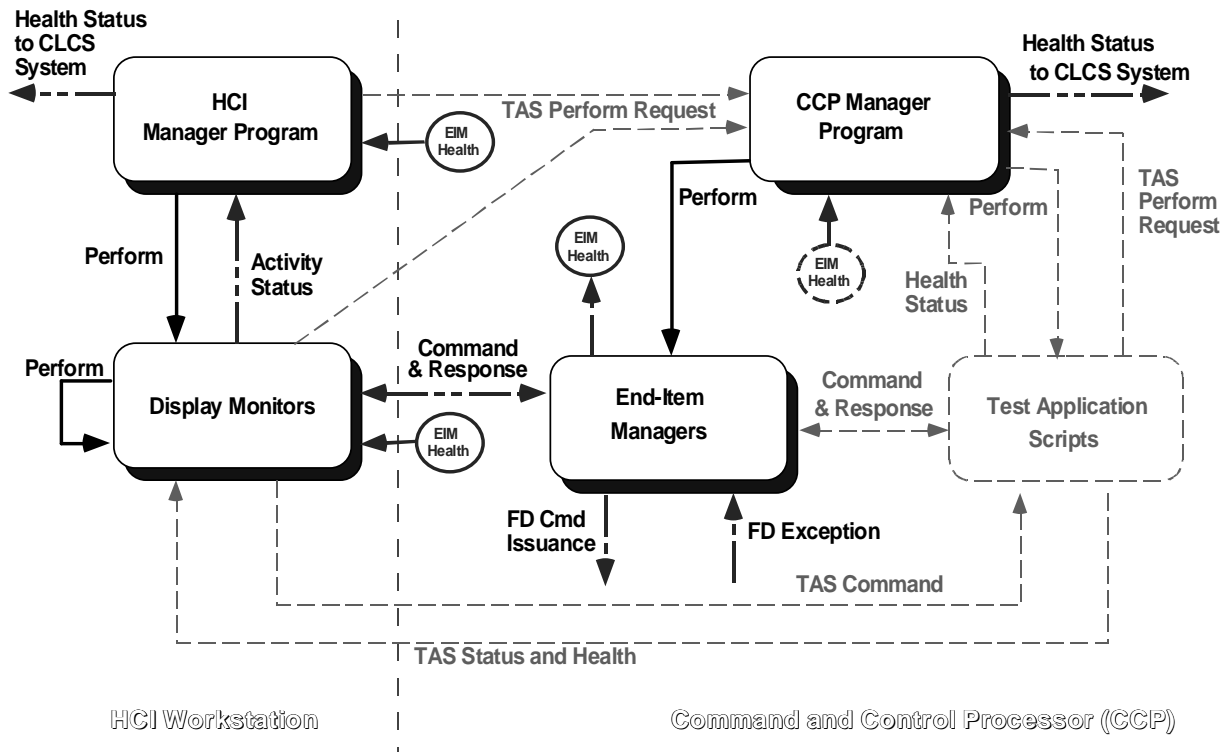


CLCS APPLICATION SOFTWARE SET ARCHITECTURE



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Acronym Definitions

API	Application Program Interface
CCP	Command and Control Processor
DM	Display Monitor
EIM	End Item Manager
FD	Function Designator
HCI	Human Computer Interface
HMP	HCI Manager Program
CMP	CCP Manager Program
OCR	Operations Control Room
TAS	Test Application Script

Architecture Overview

The organization of the CLCS Application Software Set is segmented into five major categories of programs: HCI Manager Program (HMP), CCP Manager Program (CMP), Display Monitors (DM), End Item Managers (EIM) and Test Application Scripts (TAS). This segmentation replaces the existing CCMS architecture of display programs, task programs, component programs and sequencers. The categories have been chosen to take advantage of the distributed architecture of CLCS and to enhance the reusability of software modules across multiple Application Software Sets

Programs of the five categories act as a single unified functional block. The user interacts with an interface that communicates with the programs necessary to implement the request. The architecture supports the commanding of vehicle/GSE/CLCS, the control of test scripts (sequences) and the display of data. The architecture presented is, "in a sense", transparent to the user; the number and category of programs is not critical as long as the command, control and monitor process works as required.

HCI Manager Program

The Human Computer Interface Manager Program (HMP) provides a single user interface for selecting the Display Monitors and Test Application Scripts to be performed. The following are attributes and functions of an HMP:

- The HMP is performed from either a CLCS system menu selection or from keyboard entry. There is only one HMP per Application Software Set.
- The HMP provides a list and selection mechanism (e.g. buttons) of all Display Monitors and TASs the user can perform. Upon user selection, the HMP uses an API call to perform the selected DM or to request the CMP to perform the selected TAS.
- The HMP maintains an indication (displayed to the user) of program activity for all programs (DMs and TASs) started by the user. The following items are part of that activity monitor:
 - Program activity (or health) - sent every x seconds
 - Exceptions - sent as they happen
- If the user has monitor only permissions, the HMP will not list the system TASs.
- The HMP displays the health status of all associated End Item Managers.
- The HMP provides health status to the CLCS system.

Display Monitor

A Display Monitor provides the user an interface for the display of data and information and for commanding the system's functional (hardware and software) components. The following are attributes and functions of a DM:

- All DMs will be capable of executing on either a Unix or Windows NT workstation, with the Unix platform being the primary target.
- The DM will provide a schematic/tabular/graphical representation for the display of data and information.
- Each DM will cyclically provide program status activity (e.g. "I am running", "I have an exception") to the HMP.
- All command requests will be sent to either an EIM or TAS for execution. The DM will not issue any FD commands except for emergency safing operations where speed of command execution is of primary importance. Note: Command blocking for non-authorized user will be handled at the CCP level rather than at the DM level.
- A DM may perform another DM (directly) or TAS (via request to the CCP Manager Program).
- A DM associated with a TAS shall be capable of displaying the health and status of that TAS.

CCP Manager Program

The CCP Manager Program (CMP) provides a single point for the management of all Application Software Set activities in the Command and Control Processor (CCP). The following are attributes and functions of an CMP:

- The CMP is performed by the CLCS system at Operational Control Room initialization and is always active.
- There is only one CMP per Application Software Set.
- The CMP performs all associated EIMs at program initialization.
- The CMP monitors the health of all associated EIMs and restarts them as necessary. The HMP is notified of a restart.
- The CMP fields requests from the HMP or DM to perform or terminate a TAS.
- The CMP monitors the health of all associated active TASs and restarts them as necessary (i.e. if the TAS “hangs”).
 - The CMP prompts the user for directions on restarting a TAS (i.e. restart at current sequence, restart at next sequence, don’t restart).
 - The health status provided by the TAS includes an indication of where to resume a TAS if it has to be restarted.
- The CMP provides health status to the CLCS system. Note: The CLCS system will restart the CMP as necessary.

End Item Manager

An End Item Manager is the primary interface for the commanding of any component external to the CLCS application program (i.e. vehicle/GSE, CLCS configuration,. Other software components) associated with the Application Software Set. The following are attributes and functions of an EIM:

- An EIM can encompass as little or as much of the hardware system as deemed appropriate. There can be more than one EIM per Application Software Set.
- All EIMs are always active when the CCP (physical or logical) is supporting operations.
- An EIM provides a health indication to the CLCS system so its status can be monitored by the CMP (for corrective action) and a DM (for information purposes).
- An EIM responds to FD exceptions to take corrective action when necessary and to maintain the state of a component when an external event occurs.
- A special category EIM will handle all reactive control sequences:
 - It will execute at the highest priority available to Applications Software
 - It will notify other EIMs associated with the hardware it safes of the action taken to ensure the main control EIM remains synchronous with its hardware
- An EIM maintains the state of all associated hardware components.
- An EIM handles all prerequisite control logic functions
 - Capabilities will be provided to override prerequisite checks within software and by operator action.
 - The EIM will handle CPRO command issuance also to ensure compliance with all active prerequisite checks.
- An EIM handles all requests for component FD command issuance from DMs, TASs and other EIMs.

Test Application Scripts

The functions and structures of the Test Application Scripts (TAS) have not been sufficiently defined for a concept inclusion in the Application Software Set architecture. Further definition from a project viewpoint is required before more detail can be added about this class of software.

For informational purposes, an indication of where the TAS might fit within the architecture is provided on the diagram, however this is subject to change once the scope and purpose of the TAS element is better defined.